LETTERS TO THE EDITOR.

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Layard's Beaked Whale (Mesoplodon layardi, Flower).

ON February 17 a Layard's beaked whale was found stranded on the beach a little south of Zwartkops River, north of Port Elizabeth, by Joseph G. Crawford. The following morning I dispatched my assistant, Mr. Jas. Crawford, to inspect the carcase. He brought the tusks back, when the animal was identified as Layard's beaked whale. Immediate action was taken, with the result that the skeleton is now mounted in the Port Elizabeth Museum. As the carcase was partially decomposed when discovered, it was impossible to save the skin, but measurements and drawings were taken on the spot, and the coloration of the skin noted.

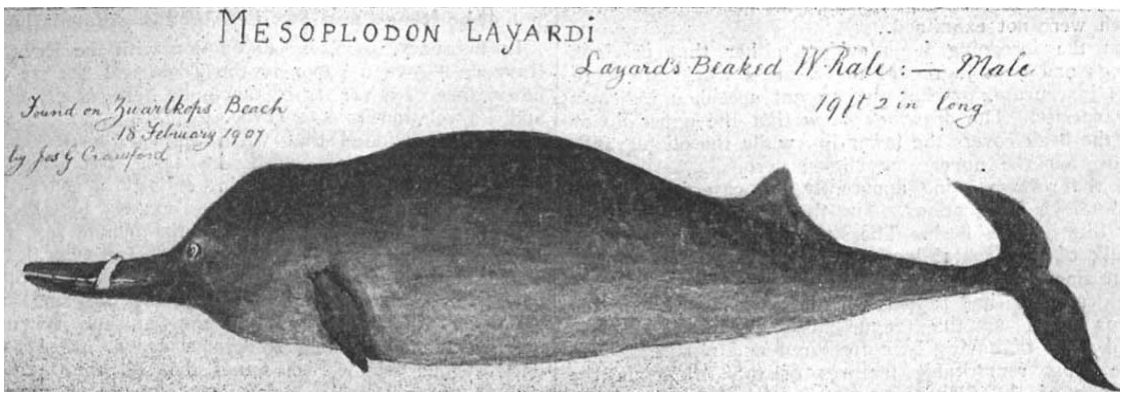

FIG. 1.—Layard's Beaked Whale, from a drawing. Engraving photographed by Mr. F. W. FitzSimons director of the Port Elizabeth Museum.

So little is known of this whale that the present specimen is of considerable importance. The skull, teeth, breast-bones, the entire skeleton, and other parts have been photographed from every point of view, while photographs have also been taken from a sketch, to scale, of the animal while lying on the beach. Any institutions requiring copies of these photographs may have them on application to me if they will defray the expense connected with their reproduction.

The following are the details :—

The animal, which was a male, measured 19 feet 2 inches in length, was entire, and showed no external injury. The colour of the back was dark brown, inclining to black on the dorsal surface, gradually merging to brown on the sides and tail, and becoming whitey-brown or dirty white on the belly. In Prof. Moseley's description there is stated to be a distinct line of demarcation between the black and the white, but in the specimen under discussion the blackish of the back gradually merged to brown on the sides, and dull white on the belly.

The flippers measured 22 inches; the dorsal fin, which is situated far back, was 13 inches wide and 11 inches high; the tail, 4 feet 6 inches across at extremes; and the interval from the point of the beak to the eye was 38 inches, and to the end of the jaw 4 feet. The exposed portion of the teeth was 11 inches long and 2½ inches wide at the base, becoming slightly narrower towards the tip, with the conical real tooth at the front of the summit. This tooth is enamelled and sharply tipped.

In the figure of the skull given by Moseley on p. 157 of "A Naturalist on the *Challenger*," there are marked differences when compared with our specimen. Thus the lower jaw shows an upward bend in front, whilst in our specimen it is straight. The proportion of the slope in the upper jaw is also dissimilar, whilst the teeth show a kind of wearing-away slope toward the middle portion. The teeth in our whale are uniform from base to tip, showing no wearing away or indication of friction. The small real tooth at the summit of each tusk is sharp, and not wart-like. Again, though the figure given by Moseley shows the teeth uniform, and not crossed, it is stated in the text that their extremities cross. The second illustration to this article distinctly shows the absence of any crossing of the tusks. This was ascertained before they were removed from the jaws. The tusks were firmly embedded in their sockets.

In Sclater's "Fauna of South Africa," vol. ii., p. 194, is an illustration of the snout of a Layard's whale with the tusks crossed, and the drawing shows important differences when compared with the photographs of our specimen. Inspection of the muzzle proved that this whale was able to open its mouth from 4½ inches to 5 inches at the tip. The fleshy covering of the upper jaw beneath the teeth showed no mark or abrasion, indicating that the beak was opened only so far as the teeth allowed. Moseley states that the hollowing-out of the central part of the tusks figured by him was caused by the friction of the snout when the animal opened its mouth. The tusks of our specimen showed no such sign, and the skin of the beak displayed no indication of coming frequently into contact with a hard body. Judging from the width of the

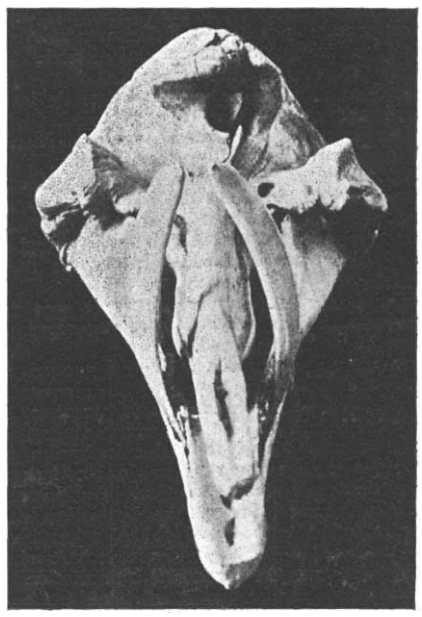

FIG. 2.—Upper views of skull of Layard's Beaked Whale. From a photograph by Mr. F. W. FitzSimons, director of the Port Elizabeth Museum.

gullet, this whale does not require to open its mouth very wide; as the gullet is only from 1¾ inches to 2 inches in diameter, it indicates that the food consists of small morsels. The sharp, enamelled tooth at the summit of the tusk is probably used for tearing and rending soft-bodied animals such as cuttle-fishes, and possibly for tearing aside seaweeds when in search of food.

The tusks are 14 inches in length, 2½ inches wide at the jaw, 1⅜ inches at the summit beneath the conical real tooth, and from ⅜ inch to ½ inch thick. On the back the blubber was 3 inches thick, and 1½ inches on the belly. The oil was of fine quality, and had great penetrating power, almost like paraffin. Owing to the advanced state of decomposition of the viscera, the contents of the stomach were not examined.

From the foregoing it is evident either that previous drawings and data in regard to Layard's whale are more or less inaccurate, or that the present specimen indicates a new species. The drawings show that the upper lip or tip of the beak covers the lower lip, while the photographs indicate that the upper jaw slightly projects beyond the lower, the reverse being apparently the case in Sclater's and Moseley's illustrations. The lips were not horny, but rather like hardish flesh. The skull is very asymmetrical, the bulk of the frontal bones inclining from the right to the left side.

The creature had apparently been injured at some previous time, as the tongue-bones and two vertebræ showed signs of having been fractured and repaired. One of the most remarkable features of this whale is the small size of the flippers as compared with that of the body. The backward position of the dorsal fin is also noticeable. With the exception of those of the skull, the bones are remarkably light and porous. Those of the beak are, however, brittle, dense, and hard.

F. W. FITZSIMONS.

Port Elizabeth Museum, May 30.

The Radio-activity of Lead and other Metals.

IN the course of some experiments that have been recently carried out in the physical laboratory at Toronto on the natural conductivity of air confined in vessels made of different metals, a wide variation was observed in the results obtained with different samples of lead. The lowest conductivity observed with air enclosed by this metal corresponded to an average production of 23 ions per c.c. per second, and the highest to a production of 160 ions per c.c. per second. The lowest value hitherto recorded for lead appears to be that quoted by Eve in his paper in the *Phil. Mag.* of September, 1906, in which he gives 96 ions per c.c. per second as the number he obtained with this metal. The sample of lead which exhibited the low activity just referred to was a sheet which had been used as a lining in a case in the laboratory for nearly thirty years.

With zinc and aluminium receivers it was found that on the average 15 ions per c.c. were generated per second in the air which they enclosed.

From measurements made with the gamma rays from radium on the ionisation produced in air confined in a lead cylinder (1) when unlined, and (2) when lined with thin sheet aluminium, due allowance being made for absorption, it was found that the ionisation in a lead cylinder due to the gamma rays was one-half that obtained with the excited secondary radiation. On the other hand, with an aluminium cylinder, the ionisation due to the secondary radiation was found to be approximately one-half that produced by the gamma rays. Assuming these results to hold for the penetrating radiation from the earth, it follows that on the average 9 ions per c.c. per second are generated in free air by this radiation. It also follows that the difference between the natural ionisation in air observed with the aluminium cylinder, viz. 15 ions per c.c. per second, and that found with the least active lead, viz. 23 ions per c.c. per second, can be wholly explained by differences in the secondary radiation excited in the two metals. This result, combined with the observed differences in the conductivity of air enclosed in vessels made of different samples of lead, goes to show that the high activity usually observed with lead is due to the presence of active impurities in it, and not to the existence of any intrinsic activity possessed by the metal. In this connection it is interesting to note that Elster and Geitel (*Phys. Zeit.*, November, 1906, and May, 1907) have recently been able to extract from commercial lead oxide and a sample of lead an active substance which they suggest may possibly turn out to be radium F.

In the experiments described above, the measurements were made with a sensitive quadrant electrometer on air confined in cylindrical vessels 60 cm. high and 24 cm. in diameter.

J. C. MCLENNAN.

University of Toronto, June 25.

Inheritance and Sex in Abraxas grossulariata.

IN February, 1906, in conjunction with the Rev. G. H. Raynor, I gave a paper to the Zoological Society on the inheritance of a variety of the moth *Abraxas grossulariata* and its relation to sex (Proc. Zool. Soc., 1906, vol. i., p. 129). We found that when the var. *lacticolor* (*flavofasciata*) was crossed with the type it behaved as a Mendelian recessive, disappearing entirely in generation F_1. When two heterozygotes were mated together, var. *lacticolor* reappeared, but only in the female sex, roughly half the females and all the males being typical. When a heterozygous male was mated with *lacticolor* female, the variety appeared in both sexes in the offspring, viz. in about half the males and half the females. When, however, a *lacticolor* male so produced was paired with a heterozygous female, we found that all the males were typical and all the females *lacticolor*. This result was given in our paper with some hesitation, since it was founded on a rather small number of specimens (29 ♂, 11 ♀), but this year it is amply confirmed. I have reared 116 males and 74 females from six families of this mating, and every male is typical, every female *lacticolor*. Mr. Raynor has also reared equally large numbers with the same result. From a family of the converse cross, on the other hand (*lacticolor* ♀ × heterozygous ♂), I have reared 24 type ♂, 22 *lacticolor* ♂, 17 type ♀, 18 *lacticolor* ♀, a fair approach to the expected equality in each sex.

I think it may be concluded definitely that in this case

(1) The type is completely dominant.
(2) DR♀ × DR♂ gives DD♂ + DR♂, DR♀ + RR♀.
(3) R♀ × DR♂ gives DR♂ + R♂, DR♀ + R♀.
(4) DR♀ × R♂ gives DR♂, R♀.
(5) R♀ × R♂ gives R♂, R♀.

(In [2] above the absence of DD females has not been proved.)

This confirmation of our previous results seems to me to lend some support to the provisional hypothesis of sex-determination outlined in the paper referred to.

L. DONCASTER.

University of Birmingham, July 2.

THE DOUBLE-DRIFT THEORY OF STAR MOTIONS.

THE problem of determining the motion of the sun amongst the stars has undergone a great change in consequence of Prof. J. C. Kapteyn's investigations which have recently become known. These researches indicated that the stars surrounding us do not form a simple system, but a dual one. From a discussion of the motions of the stars of Bradley's catalogue, Prof. Kapteyn demonstrated the existence of two great streams of stars passing through one another, and found the directions of motion of these streams relative to the sun and to one another. The Bradley stars, numbering about 2600, are mainly stars visible to the naked eye; they cover nearly three-quarters of the celestial sphere, and throughout the whole of this area Prof. Kapteyn found the same two streams prevailing, and it seemed probable that all the stars he examined belonged to one or other of the two streams.

The investigations with which this article more particularly deals are based on the proper motions